# Indices of Wisconsin Energy Efficiency

**TOTAL ENERGY USE PER $1,000 OF GROSS STATE PRODUCT**

**2.3%**

These indices can be useful in evaluating energy efficiency trends in Wisconsin. Total Energy Use per $1,000 of Gross State Product (GSP), and Electricity Use per $1,000 of GSP trended downward by 2.3 and 1.6 percent respectively.

In 2011, Wisconsin Commercial Energy Use per Employee decreased by 0.9 percent; Industrial Energy Use per $1,000 Manufacturing Value Added decreased 3.1 percent and is 55.2 percent lower than in 1970. Agricultural Energy Use per Acre increased 19.8 percent in 2011, from 1.65 to 1.81 MMBtu/acre.

Energy efficiency activities in the residential and commercial sectors are measured primarily by recording the number of buildings that have received professional audits, installed energy efficiency improvements or were certified as meeting energy efficiency building codes.

**1970-2011** MILLIONS OF BTU

| Year | Total Energy Use Per $1,000 GSP[a] | Electric Energy Use Per $1,000 GSP[a] | Residential Energy Use Per Capita[b] | Commercial Energy Use Per Employee[d] | Industrial Energy Use Per $1,000 Manufacturing Value Added[a,c] | Agricultural Energy Use Per Acre |
|---|---|---|---|---|---|---|
| 1970[r] | 12.1 | 0.90 | 73.4 | | 8.4 | 1.1 |
| 1975[r] | 11.2 | 0.98 | 74.9 | | 6.4 | 1.2 |
| 1980[r] | 10.1 | 1.03 | 75.6 | | 5.2 | 1.4 |
| 1985[r] | 9.3 | 1.05 | 71.5 | | 4.9 | 1.4 |
| 1990[r] | 9.0 | 1.07 | 72.8 | 163.1 | 4.6 | 1.2 |
| 1995[r] | 8.5 | 1.05 | 77.8 | 164.8 | 4.2 | 1.3 |
| 1996[r] | 8.3 | 1.03 | 78.6 | 164.5 | 4.1 | 1.3 |
| 1997[r] | 8.0 | 1.01 | 73.9 | 160.9 | 4.2 | 1.3 |
| 1998[r] | 7.6 | 1.00 | 69.4 | 158.2 | 3.9 | 1.2 |
| 1999[r] | 7.5 | 0.98 | 73.5 | 163.1 | 3.9 | 1.3 |
| 2000[r] | 7.5 | 0.97 | 75.3 | 161.4 | 3.8 | 1.2 |
| 2001[r] | 7.4 | 0.98 | 75.0 | 161.2 | 3.9 | 1.2 |
| 2002[r] | 7.3 | 0.98 | 76.3 | 163.0 | 3.9 | 1.3 |
| 2003[r] | 7.2 | 0.96 | 79.9 | 152.3 | 3.8 | 1.3 |
| 2004[r] | 7.1 | 0.95 | 77.6 | 147.0 | 4.0 | 1.3 |
| 2005[r] | 6.9 | 0.97 | 76.4 | 154.9 | 3.8 | 1.3 |
| 2006[r] | 6.6 | 0.95 | 71.6 | 150.7 | 3.6 | 1.5 |
| 2007[r] | 6.9 | 0.96 | 76.9 | 160.2 | 3.6 | 1.6 |
| 2008[r] | 7.1 | 0.97 | 78.5 | 162.7 | 4.1 | 1.7 |
| 2009[r] | 6.7 | 0.93 | 74.1 | 157.7 | 4.2 | 1.9 |
| 2010[r] | 6.6 | 0.93 | 73.1 | 155.5 | 3.9 | 1.6 |
| **2011[p]** | **6.5** | **0.92** | **73.3** | **154.1** | **3.8** | **1.8** |

**a** Manufacturing Value Added and Gross State Product in 2011 dollars, deflated with Gross Domestic Product Implicit Price Deflator.

**b** Not adjusted for yearly variations in temperature.

**c** Value added data for Wisconsin not available. Value added estimated using U.S. and Wisconsin trends.

**d** Per Employee Data not available prior to 1990 due to change in coding from SIC to NAICS.

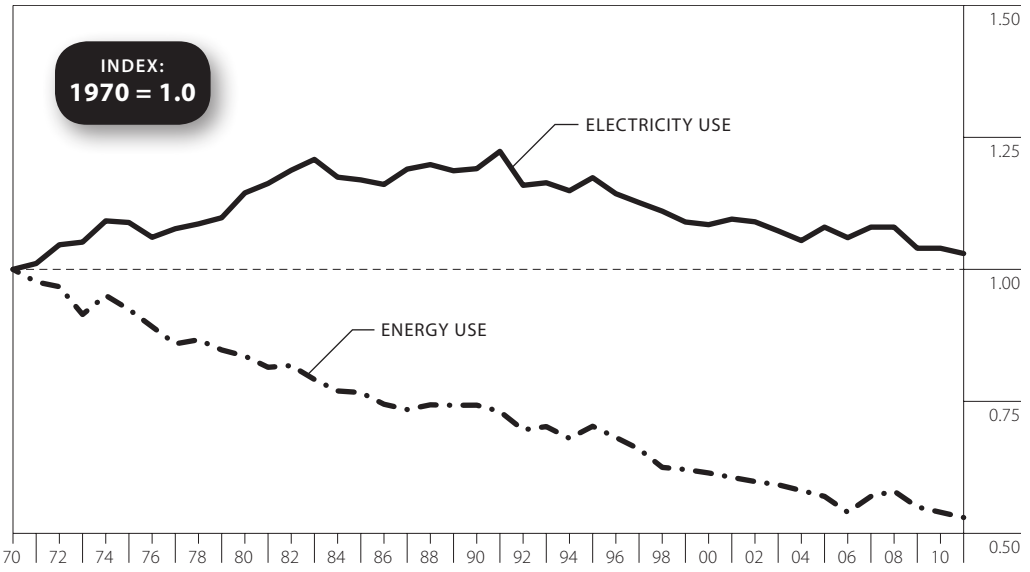
**p** Preliminary data.

**r** Revised.

**Source:** Wisconsin Department of Workforce Development employment data, http://worknet.wisconsin.gov/worknet/dalaus.aspx?menuselection=da; U.S. Department of Commerce, *Annual Survey and Census of Manufacturers* http://www.census.gov/mcd/asm-as3.html (1972-2011); Wisconsin Department of Agriculture, Trade and Consumer Protection, *Wisconsin's Agricultural Statistics, 2011*; other tables in this publication used for household estimates, gross state product, total resource energy use and use by sector.

# Indices of Wisconsin Energy Efficiency

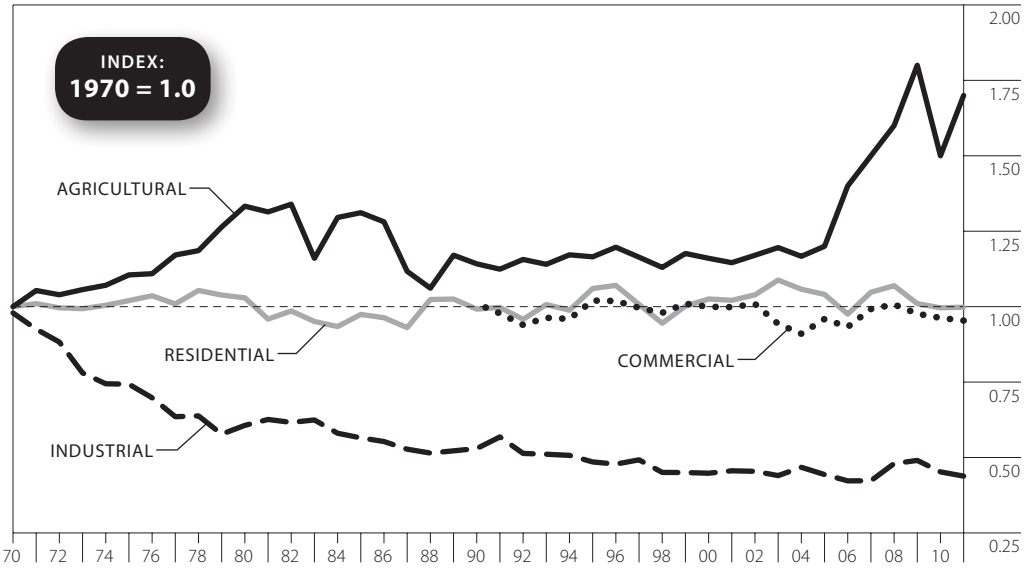
## 1970-2011 ENERGY AND ELECTRICITY USE PER DOLLAR OF GROSS STATE PRODUCT[a]




WISCONSIN ENERGY USE PER DOLLAR OF GROSS STATE PRODUCT

WISCONSIN ELECTRICITY USE PER DOLLAR OF GROSS STATE PRODUCT

## 1970-2011 ENERGY INDICES BY ECONOMIC SECTOR[a]




RESIDENTIAL ENERGY USE PER CAPITA

COMMERCIAL ENERGY USE PER EMPLOYEE

INDUSTRIAL ENERGY USE PER UNIT MANUFACTURING VALUE ADDED OUTPUT

AGRICULTURAL ENERGY USE PER ACRE

**a** All data, except commercial employment data, normalized to 1.0 in 1970, an arbitrary baseline to which all other years can be compared. Commercial employment data normalized to 1990, when industrial codes changed from SIC to NAICS.

**Source:** Wisconsin State Energy Office.

# Indices of Wisconsin Energy Expenditures, 2011 Dollars

AGRICULTURAL PER ACRE

RESIDENTIAL PER HOUSEHOLD

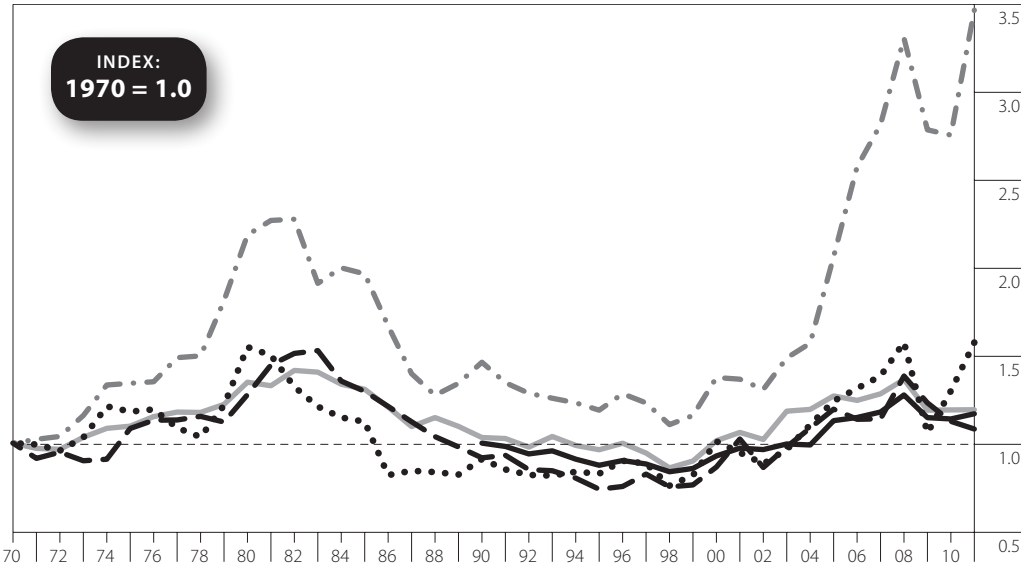
TRANSPORTATION PER VEHICLE

COMMERCIAL PER EMPLOYEE

INDUSTRIAL PER $1,000 VALUE ADDED

In 2011, Wisconsin saw increases in all but one energy expenditure index. The Expenditures per Vehicle increased 21.2 percent, Commercial Expenditures per Employee increased by 2.6 percent, Agricultural Expenditures per acre increased by 25.7 percent, Residential Expenditures per household were almost flat, with a slight increase of 0.1 percent over 2010. The Industrial Expenditures per $1,000 of Value Added decreased by 3.9 percent.

**1970-2011** 2011 DOLLARS




| Year | Agricultural Expenditures Per Acre | Commercial Expenditures Per Employee[a] | Residential Expenditures Per Household | Industrial Expenditures Per $1,000 Value Added | Transportation Expenditures Per Vehicle |
|---|---|---|---|---|---|
| 1970[r] | 14 | | 1,684 | 36 | 1,409 |
| 1975 | 18 | | 1,847 | 39 | 1,661 |
| 1980 | 30 | | 2,268 | 46 | 2,178 |
| 1985[r] | 27 | | 2,200 | 47 | 1,580 |
| 1990[r] | 20 | 1,260 | 1,738 | 33 | 1,281 |
| 1995[r] | 16 | 1,102 | 1,621 | 27 | 1,164 |
| 2000[r] | 19 | 1,168 | 1,708 | 31 | 1,423 |
| 2001[r] | 19 | 1,224 | 1,787 | 37 | 1,333 |
| 2002[r] | 18 | 1,214 | 1,719 | 31 | 1,244 |
| 2003[r] | 20 | 1,254 | 1,991 | 36 | 1,358 |
| 2004[r] | 21 | 1,247 | 2,007 | 40 | 1,555 |
| 2005[r] | 28 | 1,421 | 2,136 | 43 | 1,746 |
| 2006[r] | 35 | 1,444 | 2,093 | 41 | 1,847 |
| 2007[r] | 38 | 1,483 | 2,156 | 41 | 1,946 |
| 2008[r] | 45 | 1,605 | 2,294 | 50 | 2,216 |
| 2009[r] | 38 | 1,443 | 1,999 | 45 | 1,491 |
| 2010[r] | 37 | 1,433 | 2,002 | 41 | 1,827 |
| **2011[p]** | **47** | **1,470** | **2,004** | **39** | **2,214** |

**a** All data, except commercial employment data, normalized to 1.0 in 1970, an arbitrary baseline to which all other years can be compared. Commercial employment data normalized to 1990, when industrial codes changed from SIC to NAICS.

**p** Preliminary estimate.

**r** Revised.

**Source:** Compiled from tables in this publication for Wisconsin residential, commercial, industrial, agricultural and transportation energy use.

# Wisconsin Per Capita Resource Energy Consumption, by Type of Fuel

**1970-2011** MILLIONS OF BTU

| Year | Petroleum | Natural Gas | Coal | Renewable | Nuclear | Electric Imports[a] | Total |
|---|---|---|---|---|---|---|---|
| 1970 | 103.6 | 74.1 | 80.4 | 6.2 | 0.4 | -6.4 | 258.3 |
| 1975 | 104.0 | 80.7 | 57.4 | 6.4 | 24.3 | -4.5 | 268.5 |
| 1980r | 96.6 | 73.1 | 69.0 | 10.4 | 22.7 | -1.4 | 270.4 |
| 1982r | 85.3 | 65.8 | 67.6 | 10.7 | 23.5 | 2.3 | 255.2 |
| 1985r | 87.7 | 64.1 | 78.9 | 10.9 | 25.0 | -0.4 | 266.2 |
| 1990r | 90.0 | 62.6 | 84.1 | 10.3 | 24.8 | 17.9 | 289.7 |
| 1995r | 91.0 | 74.2 | 90.3 | 9.7 | 23.1 | 24.0 | 312.2 |
| 1996r | 93.1 | 77.9 | 94.0 | 10.5 | 21.1 | 15.5 | 312.1 |
| 1997r | 93.4 | 76.5 | 97.5 | 10.1 | 8.1 | 24.9 | 310.5 |
| 1998r | 93.4 | 69.6 | 93.9 | 9.0 | 19.2 | 20.4 | 305.5 |
| 1999r | 96.2 | 71.5 | 95.0 | 9.3 | 23.3 | 18.8 | 314.1 |
| 2000r | 93.6 | 73.3 | 96.8 | 10.3 | 23.1 | 18.3 | 315.5 |
| 2001r | 93.1 | 66.5 | 96.4 | 10.0 | 23.0 | 22.5 | 311.5 |
| 2002r | 93.9 | 70.4 | 93.1 | 10.5 | 24.6 | 18.4 | 310.9 |
| 2003r | 93.5 | 71.7 | 95.9 | 10.8 | 24.0 | 15.8 | 311.6 |
| 2004r | 94.1 | 69.1 | 97.0 | 11.1 | 23.2 | 17.0 | 311.4 |
| 2005r | 89.5 | 73.7 | 95.2 | 11.2 | 14.6 | 22.3 | 306.4 |
| 2006r | 88.0 | 66.5 | 91.8 | 11.6 | 23.5 | 14.4 | 295.5 |
| 2007r | 88.0 | 71.0 | 91.4 | 12.9 | 24.7 | 21.5 | 309.2 |
| 2008r | 84.3 | 72.7 | 95.4 | 14.1 | 23.2 | 18.5 | 307.5 |
| 2009r | 79.3 | 68.8 | 85.3 | 14.2 | 24.1 | 17.3 | 288.6 |
| 2010r | 80.1 | 65.7 | 92.0 | 14.9 | 25.2 | 14.1 | 291.7 |
| **2011p** | **78.7** | **69.5** | **86.3** | **15.6** | **21.9** | **17.2** | **288.8** |

**a** "Electric Imports" is the estimated resource energy used in other states or Canada to produce the electricity imported into Wisconsin. This resource energy is estimated assuming 11,300 Btu of resource energy per kWh imported into Wisconsin. A negative sign indicates that resource energy was used in Wisconsin to produce electricity that was exported.

**p** Preliminary estimates.

**r** Revised.

**Source:** Compiled from tables in this publication for Wisconsin petroleum, natural gas, coal and renewable energy use, electric imports and population.


Wisconsin's per capita resource energy consumption decreased 1.0 percent in 2011. However, compared to the low point in 1982, 2011 per capita energy use in Wisconsin is 13.3 percent higher.

# Wisconsin Residential Electricity and Natural Gas Use Per Customer

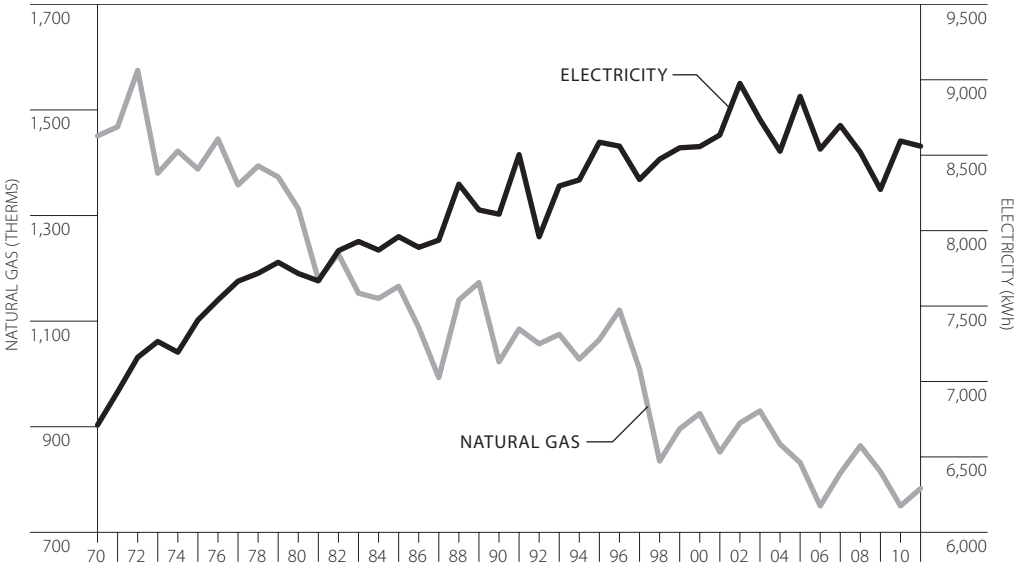
**ELECTRICITY USE PER CUSTOMER**
**0.4%**

**NATURAL GAS USE PER CUSTOMER**
**4.4%**

Electricity Use per Customer decreased 0.4 percent in 2011, while natural gas use increased 4.4 percent. The increase in natural gas relates to the relatively low price of the fuel, and an increase in Heating Degree Days (HDD) in 2011—a 6.1 percent increase over 2010. To learn more about HDDs, see the Miscellaneous chapter of this publication.

These data are from the AF2 reports submitted to the Public Service Commission of Wisconsin by gas utilities across the state. The complete datasets are published online at stateenergyoffice.wi.gov under Statistics/Tables.

**1970-2011**




| Year | Natural Gas[a] | | Electricity | |
|---|---|---|---|---|
| | Number of Customers (Thousands) | Use Per Customer (Therms) | Number of Customers (Thousands) | Use Per Customer (kWh) |
| 1970[r] | 750.4 | 1,451 | 1,429 | 6,711 |
| 1975[r] | 858.5 | 1,388 | 1,607 | 7,407 |
| 1980[r] | 966.0 | 1,313 | 1,801 | 7,716 |
| 1985[r] | 1,013.0 | 1,166 | 1,870 | 7,960 |
| 1990[r] | 1,123.6 | 1,023 | 2,017 | 8,109 |
| 1995[r] | 1,291.4 | 1,065 | 2,170 | 8,586 |
| 2000[r] | 1,459.0 | 925 | 2,329 | 8,557 |
| 2001[r] | 1,484.5 | 852 | 2,365 | 8,634 |
| 2002[r] | 1,514.7 | 907 | 2,404 | 8,976 |
| 2003[r] | 1,541.5 | 930 | 2,445 | 8,736 |
| 2004[r] | 1,569.7 | 867 | 2,486 | 8,526 |
| 2005[r] | 1,592.6 | 832 | 2,526 | 8,890 |
| 2006[r] | 1,611.8 | 750 | 2,550 | 8,540 |
| 2007[r] | 1,632.2 | 812 | 2,573 | 8,697 |
| 2008[r] | 1,646.6 | 864 | 2,580 | 8,519 |
| 2009[r] | 1,656.6 | 815 | 2,589 | 8,273 |
| 2010[r] | 1,663.6 | 750 | 2,595 | 8,594 |
| **2011[p]** | **1,670.7** | **783** | **2,600** | **8,560** |

**a** U. S. Department of Energy/Energy Information Administration data from EIA forms 176 and 861.

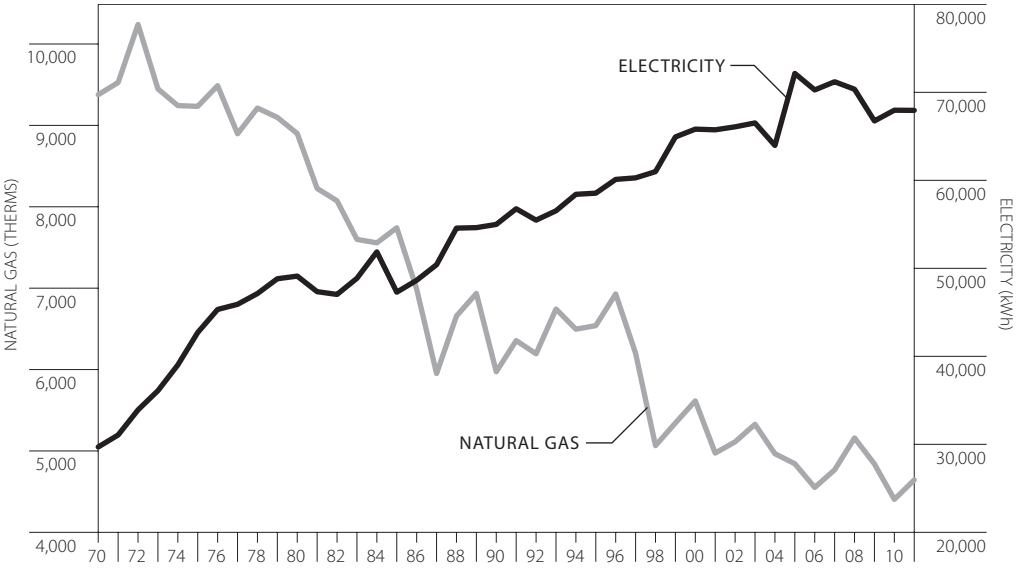
**p** Preliminary estimates.

**r** Revised.

**Source:** Edison Electric Institute, *Statistical Yearbook* (1971-1996); Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1979), Public Service Commission of Wisconsin, form PSC-AF 2 *Gas Sales and Sales Ratio* (1980-2011); U.S. Department of Energy, *Electric Sales and Revenues 1993-2000* [DOE/EIA-0540(2000)] (November 2001).

# Wisconsin Commercial Electricity and Natural Gas Use Per Customer

## 1970-2011




| Year | Natural Gas | | Electricity | |
|---|---|---|---|---|
| | Number of Customers (Thousands) | Use Per Customer (Therms) | Number of Customers (Thousands) | Use Per Customer (kWh) |
| 1970r | 50.8 | 9,377 | 167 | 29,701 |
| 1975r | 65.7 | 9,234 | 178 | 42,709 |
| 1980r | 76.7 | 8,900 | 193 | 49,115 |
| 1985r | 87.0 | 7,742 | 224 | 47,292 |
| 1990r | 106.0 | 5,973 | 229 | 54,990 |
| 1995r | 125.5 | 6,540 | 254 | 58,540 |
| 2000r | 140.4 | 5,615 | 278 | 65,817 |
| 2001r | 144.1 | 4,974 | 284 | 65,741 |
| 2002r | 149.8 | 5,112 | 290 | 66,081 |
| 2003r | 150.1 | 5,327 | 301 | 66,522 |
| 2004r | 151.9 | 4,966 | 302 | 63,963 |
| 2005r | 155.1 | 4,843 | 312 | 72,150 |
| 2006r | 159.1 | 4,552 | 324 | 70,272 |
| 2007r | 160.6 | 4,768 | 330 | 71,203 |
| 2008r | 163.0 | 5,160 | 334 | 70,353 |
| 2009r | 163.8 | 4,840 | 337 | 66,748 |
| 2010r | 164.2 | 4,405 | 338 | 67,969 |
| **2011p** | **164.8** | **4,644** | **339** | **67,950** |

**p** Preliminary estimates.

**r** Revised.

**Source:** Edison Electric Institute, *Statistical Yearbook* (1971-1996); Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1979), Public Service Commission of Wisconsin, form PSC-AF 2 *Gas Sales and Sales Ratio* (1980-2011); U.S. Department of Energy, *Electric Sales and Revenues 1993-2000* [DOE/EIA-0540(2000)] (November 2001).

**ELECTRICITY USE PER CUSTOMER 0.03%**

**NATURAL GAS USE PER CUSTOMER 5.4%**

Commercial electricity use per customer in 2011 decreased 0.03 percent, while natural gas use per customer increased 5.4 percent. The increase in natural gas relates to the relatively low price for natural gas, and ain increase in Heating Degree Days (HDD) in 2011—a 6.1 percent increase compared to 2010. To learn more about HDDs, see the Miscellaneous chapter in this publication.

# Focus on Energy Tracked Energy Savings

Focus on Energy is Wisconsin's rate-payer funded energy efficiency and renewable energy program. It works with energy consumers—individuals, business, industry, government—to evaluate and help fund energy efficiency and renewable energy efforts.

The table shows annual first-year[c] energy savings in Wisconsin due to Focus on Energy efforts. Gross electricity savings are shown in kilowatt hours (kWhs), while gross natural gas savings are shown in therms. The percent column shows the percent of statewide sales, by sector, represented by the verified gross savings.

The efforts of Focus on Energy undergo regular evaluation by independent contractors who certify program-tracked savings. The verified gross kWh, KW and therm savings have been verified by a third-party contractor.

**2001-2011** MILLIONS OF kWhs, THERMS AND DOLLARS

| | Verified kWh Saved | Percent of Statewide Sector[a] kWh Saved | Verified Therms Saved | Percent of Statewide Sector Sales[b] Therms Saved | Dollar Value of Energy Saved | Number of Participants |
|---|---|---|---|---|---|---|
| **July 1, 2001 - June 30, 2007[c]** | | | | | | |
| **Total Saved** | 1,178.45 | | 61,118,326 | | $167,907,949 | 1,113,842 |
| Business | 689.82 | | 48,588,762 | | $94,944,633 | 43,281 |
| Residential | 440.95 | | 9,247,900 | | $65,615,728 | 1,070,213 |
| Renewables | 47.69 | | 3,281,664 | | $7,347,588 | 348 |
| **July 1, 2007 - December 31, 2008** | | | | | | |
| **Total Saved** | 599.26 | 0.567% | 26,622,537 | 0.434% | $79,598,763 | 592,714 |
| Business | 412.28 | 0.557% | 20,247,680 | 0.501% | $49,925,700 | 27,658 |
| Residential | 179.99 | 0.568% | 4,145,352 | 0.198% | $27,217,319 | 564,660 |
| Renewables | 6.99 | | 2,229,505 | | $2,455,744 | 396 |
| **January 1, 2009 - December 31, 2009** | | | | | | |
| **Total Saved** | 634.62 | 0.957% | 29,661,512 | 0.759% | $83,273,246 | 514,714 |
| Business | 500.79 | 1.091% | 20,712,687 | 0.810% | $58,696,839 | 20,517 |
| Residential | 116.89 | 0.573% | 3,591,004 | 0.266% | $18,660,979 | 493,780 |
| Renewables | 16.93 | | 5,357,821 | | $5,915,428 | 417 |
| **January 1, 2010 - December 31, 2010** | | | | | | |
| **Total Saved** | 590.64 | 0.859% | 23,640,236 | 0.633% | $75,411,086 | 432,636 |
| Business | 470.99 | 0.993% | 20,041,916 | 0.806% | $56,396,192 | 17,672 |
| Residential | 119.65 | 0.562% | 3,598,320 | 0.288% | $19,014,894 | 414,964 |
| Renewables | 0.00 | 0.000% | 0 | 0.000% | $0 | 0 |
| **January 1, 2011 - December 31, 2011** | | | | | | |
| **Total Saved** | 440.60 | 0.641% | 16,707,201 | 0.423% | $56,695,791 | 194,285 |
| Business | 346.71 | 0.731% | 13,831,959 | 0.523% | $41,183,316 | 12,860 |
| Residential | 93.89 | 0.442% | 2,875,242 | 0.220% | $15,512,475 | 181,425 |
| Renewables | 0.00 | 0.000% | 0 | 0.000% | $0 | 0 |
| **July 1, 2001 - December 31, 2011** | | | | | | |
| **Total Saved** | 3443.58 | 0.478% | 157,749,812 | 0.385% | $462,886,835 | 2,848,191 |
| Business | 2420.59 | 0.483% | 123,423,004 | 0.458% | $301,146,680 | 121,988 |
| Residential | 951.38 | 0.433% | 23,457,818 | 0.167% | $146,021,395 | 2,725,042 |
| Renewables | 71.61 | | 10,868,990 | | $15,718,760 | 1,161 |

**a** Statewide sector sales are estimated for the non-annual reporting periods using annual data from the Wisconsin Electric Utility Sales, by Economic Sector table in Chapter Two of this publication.

**b** Statewide sector sales are estimated for the non-annual reporting periods using annual data from the Wisconsin Natural Gas Use, by Economic Sector table in Chapter Two of this publication. Data from this chapter are converted from tBtus to Therms for the purpose of calculation.

**c** Annual, first-year energy savings are what an energy saving measure accomplished during the first year, as opposed to lifetime savings.

**Source:** Public Service Commission of Wisconsin, Focus on Energy Evaluation *Evaluation Report 2011*, October 31, 2012; https://focusonenergy.com/about/evaluation-reports

# Focus on Energy Ranked Energy Savings Measures

## 2001-2011 ENERGY SAVING ACTIVITIES RANKED BY OVERALL SAVINGS

| | Business Programs | | Residential Programs | |
|---|---|---|---|---|
| **Electricity** | **Savings (Million kWh)** | **Percent Overall Savings** | **Savings (Million kWh)** | **Percent Overall Savings** |
| Compact Flouresent Lights (CFL) | 259.05 | 10.7% | 519.51 | 54.6% |
| ECM[a] Furnace | | | 111.11 | 11.7% |
| High Bay Flouresent | 226.93 | 9.4% | | |
| Hot Water[b] | | | 29.63 | 3.1% |
| Lighting (other than listed)[c] | 483.71 | 20.0% | 141.21 | 14.8% |
| Other[d] | 294.28 | 12.2% | 54.07 | 5.7% |
| T8/T5 Flourescent Lighting | 230.97 | 9.5% | | |
| **Electric Total Verified kWh Savings – All Efforts** | **2,420.59** | | **951.38** | |

| | Business Programs | | Residential Programs | |
|---|---|---|---|---|
| **Natural Gas** | **Savings (Therm)** | **Percent Overall Savings** | **Savings (Therm)** | **Percent Overall Savings** |
| Boiler Equipment/Other Heating | 16,749,391 | 13.6% | 6,627,078 | 28.3% |
| Building Shell | | | 5,727,545 | 24.4% |
| Clothes Washer | | | 1,152,285 | 4.9% |
| ECM[a] Furnace | | | 2,710,934 | 11.6% |
| Energy Recovery[e] | 19,551,023 | 15.8% | | |
| Hot Water[b] | | | 3,457,372 | 14.7% |
| HVAC | 15,065,499 | 12.2% | | |
| Process[f] | 19,725,048 | 16.0% | | |
| Other[g] | 11,035,484 | 8.9% | 2,459,951 | 10.2% |
| **Natural Gas Total Verified kWh Savings – All Efforts** | **123,423,004** | | **23,457,818** | |

**a** Electronically commutative motors (ECM) differ from conventional motors in their overall efficiency.

**b** Hot water refers to a variety of different measures to improve hot water heating and usage efficiency.

**c** Lighting improvements such as efficient lighting fixtures, torchieres, and ceiling fans, and motion/occupancy sensors.

**d** Other includes a wide variety of improvements.

**e** Recovery of exhaust heat from natural gas combustion.

**f** Process efforts include in-line energy efficiency and heat capture, primarily in industrial applications. May also include efficiency improvements to compressed air usage.

**g** Steam trap improvement to avoid loss of thermal energy.

**Source:** Public Service Commission of Wisconsin, Focus on Energy Evaluation *Evaluation Report 2011*, October 31, 2012; https://focusonenergy.com/about/evaluation-reports

The table shows the five energy savings efforts funded by Focus on Energy that reaped the largest energy savings benefit. The measures are different for the business and residential sectors, and are listed according to the saved energy (e.g., kWhs or therms).

As Focus on Energy has grown, energy savings across Wisconsin have increased. In 2009, verified gross savings are about one percent of annual sales of both electricity and natural gas. The work of Focus on Energy helps to reduce overall consumption of fossil-fuel based energy and increase energy efficiency across the state.

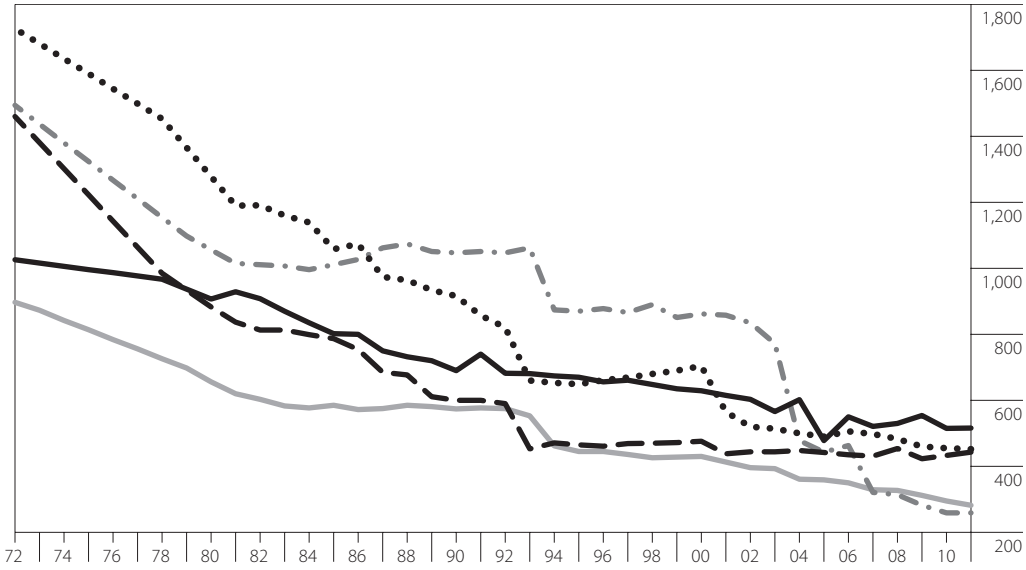
# Energy Consumption by Major New Household Appliances

REFRIGERATOR
WASHING MACHINE
FREEZER
ROOM A/C
DISHWASHER

Since 1980, energy usage of new household appliances sold in the U.S. has decreased from 43.1 percent (room air conditioners) to 75.5 percent (washing machines), depending upon the appliance.

From 1994 to 2000, average usage remained essentially unchanged. However, changes in federal energy efficiency standards since 2000 have reduced average new appliance energy consumption from 6.9 percent for freezers to 70.0 percent for washing machines. Appliance data makes it easier to understand residential energy use trends.

**1972-2011** AVERAGE kWh PER YEAR




| Year | Room A/C[a] | Washing Machine[b] | Dishwasher[b] | Refrigerator[c] | Freezer[c] |
|---|---|---|---|---|---|
| 1972 | 1,026 | 1,494 | 897 | 1,726 | 1,460 |
| 1975 | 996 | 1,324 | 814 | 1,590 | 1,223 |
| 1980 | 907 | 1,056 | 656 | 1,278 | 883 |
| 1985 | 802 | 1,011 | 585 | 1,058 | 787 |
| 1990 | 690 | 1,047 | 574 | 916 | 600 |
| 1995 | 670 | 870 | 445 | 649 | 465 |
| 2000[e] | 629 | 862 | 430 | 704 | 476 |
| 2005 | 478 | 443 | 359 | 490 | 442 |
| 2006 | 550 | 463 | 350 | 506 | 435 |
| 2007[e] | 521 | 321 | 329 | 498 | 431 |
| 2008 | 530 | 314 | 327 | 483 | 454 |
| 2009[r] | 554 | 282 | 312 | 460 | 423 |
| 2010[r] | 515 | 259 | 295 | 455 | 433 |
| **2011[p]** | **516** | **259** | **282** | **452** | **443** |
| **Best Available[f]** | **556** | **238** | **295** | **468** | **456** |
| **Energy Star[d]** | **500** | **122** | **180** | **429** | **403** |

**a** Room air conditioner assumes 600 hours per year.

**b** Loads per year: washing machine (392), dishwasher (215) . Energy use assumes electric water heater.

**c** Refrigerator and freezer values estimated.

**d** U.S. Environmental Protection Agency (EPA) Energy Star efficiency values for average size appliance.

**e** Refrigerator and freezer standards increased July 1, 2001. Air conditioner standards increased October 1, 2000. Clothes waster standards increased January 1, 2004 and January 1, 2007. Dishwasher standards increased May 14, 1994 and January 1, 2010.

**f** Best available (most energy efficient) appliance that can be purchased for the average size and type sold today.

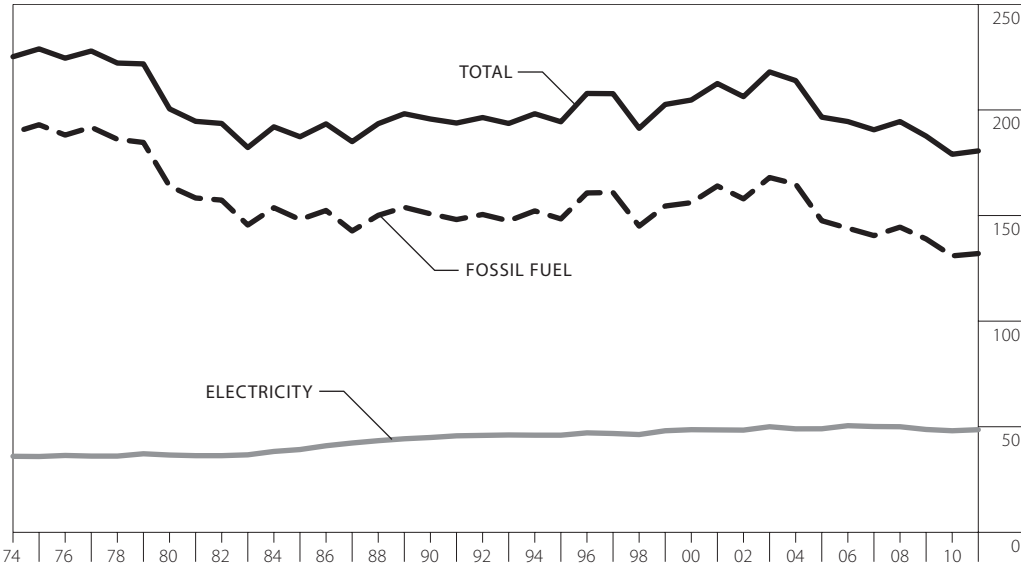
**p** Preliminary estimates.

**r** Revised.

**Source:** Association of Home Appliance Manufacturers (AHAM) Information Center.

# Energy Use in State Owned Buildings

**1974-2011** THOUSANDS OF BTU PER GROSS SQUARE FOOT PER YEAR




| Fiscal Year | Fossil Fuel | Electricity | Total Energy BTU/GSF | Total Energy Weather-Adjusted[a] | Million Gross Square Feet |
|---|---|---|---|---|---|
| 1974 | 189.2 | 36.0 | 225.2 | | 42.7 |
| 1975 | 193.0 | 35.9 | 228.9 | | 43.6 |
| 1980 | 163.9 | 36.6 | 200.5 | | 46.2 |
| 1985 | 148.1 | 39.2 | 187.3 | | 47.9 |
| 1990 | 150.8 | 44.9 | 195.7 | | 49.7 |
| 1995 | 148.4 | 46.0 | 194.4 | | 52.6 |
| 2000 | 156.1 | 48.6 | 204.7 | | 55.4 |
| 2001 | 164.0 | 48.5 | 212.5 | | 56.6 |
| 2002[r] | 157.9 | 48.4 | 206.3 | | 58.0 |
| 2003[r] | 168.0 | 50.0 | 218.0 | | 59.0 |
| 2004[r] | 164.9 | 49.0 | 213.9 | | 59.4 |
| 2005[a,r] | 147.5 | 49.0 | 196.6 | 196.6 | 67.4 |
| 2006[r] | 144.0 | 50.5 | 194.5 | 196.4 | 67.9 |
| 2007[r] | 140.5 | 50.1 | 190.6 | 190.1 | 69.3 |
| 2008[r] | 144.5 | 50.0 | 194.5 | 187.0 | 70.7 |
| 2009[r] | 138.9 | 48.7 | 187.6 | 179.6 | 71.4 |
| 2010[r] | 130.9 | 48.1 | 179.0 | 177.7 | 71.2 |
| **2011[p]** | **132.0** | **48.6** | **180.6** | **174.3** | **72.0** |

**a** Weather-adjusted data are not available previous to 2005.

**b** http://www.wisgov.state.wi.us/journal_media_detail.asp?locid=19&prid=1907

**p** Preliminary estimates.

**r** Revised.

**Source:** State of Wisconsin, Department of Administration; *Energy Use in State Owned Facilities* Unpublished.

**TOTAL ENERGY USE PER GSF 1.9% IN 2011**

In 2011, total energy use per gross square foot (GSF), adjusted for weather, decreased 1.9 percent from 2010. Since 1974, overall use per GSF in state owned buildings fell 19.8 percent. Electricity use has increased 35.1 percent per GSF between 1974 and 2011, while fossil fuel use decreased 30.2 percent.

Energy use in state-owned buildings was weather-corrected back to 2005 to meet the requirements set forth in Executive Order 145[b] that addressed energy usage in state facilities. All data are based on the State Fiscal Year, July 1 – June 30, for example the data for 2011 are for the period July 1, 2010 to June 20, 2011.

# Low Income Units Weatherized Through State- and Utility-Supported Programs

**NUMBER OF UNITS WEATHERIZED**
**1.2%**

The number of units weatherized[a] in 2011 decreased by 1.2 percent from 2010. This is due in part to the cessation of additional funding through the American Recovery and Reinvestment Act (ARRA) of 2009.

The Wisconsin Division of Energy Services, under the Department of Administration, contracts with various agencies throughout the state to provide weatherization[a] services to the low-income population. Agencies include community action agencies, housing authorities, tribes, local governments, and other non-profit organizations.

The Weatherization Assistance Program was created under Title IV of the Energy Conservation and Production Act of 1976, and was designed to cut heating bills and save imported oil. See http://www.homeenergyplus.wi.gov/ for local information.

## 1980-2011

| Year[d] | Department of Administration[b] | Wisconsin Utilities | Combined Totals |
|---|---|---|---|
| 1980 | 5,811 | | 5,811 |
| 1985 | 7,355 | 4,139 | 11,494 |
| 1990 | 9,302 | 3,384 | 12,686 |
| 1995 | 6,126 | 5,455 | 11,581 |
| 1996 | 4,575 | 6,651 | 11,226 |
| 1997 | 4,530 | 4,626 | 9,156 |
| 1998 | 3,854 | 4,848 | 8,702 |
| 1999 | 3,703 | 5,700 | 9,403 |
| 2000[c] | 4,246 | 6,434 | 10,680 |
| 2001 | 4,867 | 3,378 | 8,245 |
| 2002[e] | 5,948 | 1,493 | 7,441 |
| 2003 | 7,368 | 0 | 7,368 |
| 2004 | 8,027 | 0 | 8,027 |
| 2005 | 8,721 | 0 | 8,721 |
| 2006 | 9,057 | 0 | 9,057 |
| 2007 | 10,215 | 0 | 10,215 |
| 2008 | 8,645 | 0 | 8,645 |
| 2009 | 10,534 | 0 | 10,534 |
| 2010 | 15,392 | 0 | 15,392 |
| **2011[p]** | **15,211** | **0** | **15,211** |
| **Total** | **246,497** | **81,227** | **327,724** |

**a** Weatherization is any job in which either the state or a utility, or both, installs envelope efficiency measures, appliance efficiency measures, heating equipment replacement/retrofits, or any combination of these.

**b** In July 1992, the Low Income Weatherization Assistance Program was transferred from the Department of Health and Family Services to the Department of Administration.

**c** Estimates.

**d** In 1992, the program year was changed to April-March.

**e** Wisconsin's Public Benefits Program began in October 2000. This program has transitioned responsibility for weatherizing low-income households from the utilities to the Department of Administration, Division of Energy. The transition was completed at the end of December 2002.

**p** Preliminary estimate.

**Source:** Public Service Commission of Wisconsin, Division of Energy Planning and Programs, unpublished annual data; Wisconsin Department of Health and Family Services, Energy Services Section, unpublished annual data; Department of Administration (DOA), Division of Energy Services, *Annual Weatherization Production*, report to U.S. DOE for 2011, and unpublished data (2011).

# Reported Building Activity Affected by Wisconsin Energy Codes

**1979-2011**

| Year | New One and Two Family Units[b] | New Manufactured Dwelling Units[c,f,g] | Manufactured Homes (HUD Certified)[f,h] | New & Altered Public and Commercial Buildings[d] | Existing Rental Properties[e] | Total |
|---|---|---|---|---|---|---|
| 1979 | NA | NA | NA | 4,332 | | 4,332 |
| 1980 | 3,302 | 906 | | 3,818 | | 8,026 |
| 1985 | 6,146 | 1,147 | | 6,380 | 2,267 | 15,940 |
| 1990 | 10,286 | 1,253 | | 7,378 | 4,849 | 23,766 |
| 1995 | 12,846 | 1,991 | | 8,434 | 6,955 | 30,226 |
| 1996 | 14,051 | 2,108 | | 8,088 | 7,162 | 31,409 |
| 1997 | 13,390 | 1,826 | | 7,341 | 7,488 | 30,045 |
| 1998 | 14,662 | 1,856 | | 6,793 | 7,616 | 30,927 |
| 1999 | 13,282 | 2,292 | | 7,387 | 7,270 | 30,231 |
| 2000 | 14,799 | 2,085 | | 6,606 | 7,510 | 31,000 |
| 2001 | 14,653 | 1,926 | | 6,501 | 6,296 | 29,376 |
| 2002 | 15,479 | 1,933 | | 6,516 | 6,318 | 30,246 |
| 2003 | 18,851 | 1,999 | | 6,455 | 5,136 | 32,441 |
| 2004 | 18,641 | 2,141 | 2,016 | 6,658 | 5,221 | 34,677 |
| 2005 | 19,762 | 1,962 | 1,710 | 6,810 | 4,948 | 35,192 |
| 2006 | 14,767 | 1,596 | 1,124 | 8,932 | 4,181 | 30,600 |
| 2007[g] | 13,393 | | 698 | 6,034 | 3,538 | 23,663 |
| 2008 | 9,004 | | 413 | 4,840 | 2,671 | 16,928 |
| 2009 | 6,911 | | 207 | 3,565 | 2,680 | 13,363 |
| 2010[h] | 6,529 | | | 3,596 | 2,694 | 12,819 |
| **2011[p]** | **5,099** | | | **3,693** | **2,541** | **11,333** |

**a** Includes Chapter Commerce 22 of the Uniform Dwelling Code; Chapter Commerce 63 of the Commercial Building Code; and Chapter Commerce 67 (State Rental Unit Energy Efficiency Standards).

**b** Based on Uniform Dwelling Code permits issued. Through 2004, communities with a population of fewer than 2,500 could opt out from code enforcement and may not have issued permits. Previous numbers may have included some manufactured dwelling units.

**c** Reporting is required for all manufactured dwelling units. These dwelling units meet state standards and are generally delivered to the dwelling site on a flatbed.

**d** Includes new building and alteration plans submitted and approved by the state under general building code provisions. Some projects are exempt from plan review or were locally approved instead.

**e** Properties certified as meeting code requirements during current year, regardless of year of actual transfer of ownership.

**f** These dwelling units meet federal HUD standards, which are lower than state standards, have a chassis and generally are towed to the dwelling site.

**g** From 2007 forward, this category is fully captured in the One and Two Family Dwelling total.

**h** From 2010 forward, this category is fully captured in the One and Two Family Dwelling total.

**p** Preliminary.

**NA** – Not applicable. Rental Unit Energy Efficiency Code effective January 1, 1985 and Uniform Dwelling Code Effective June 1, 1980.

**Source:** Department of Safety and Professional Services, internal data files.

BUILDINGS CERTIFIED IN 2011 DECREASED **11.6%**

More than 11,000 buildings were certified in 2011 as meeting Wisconsin's energy efficiency building codes[a], an 11.6 percent decrease from 2010. The number of buildings certified peaked in 2005 with 35,192.

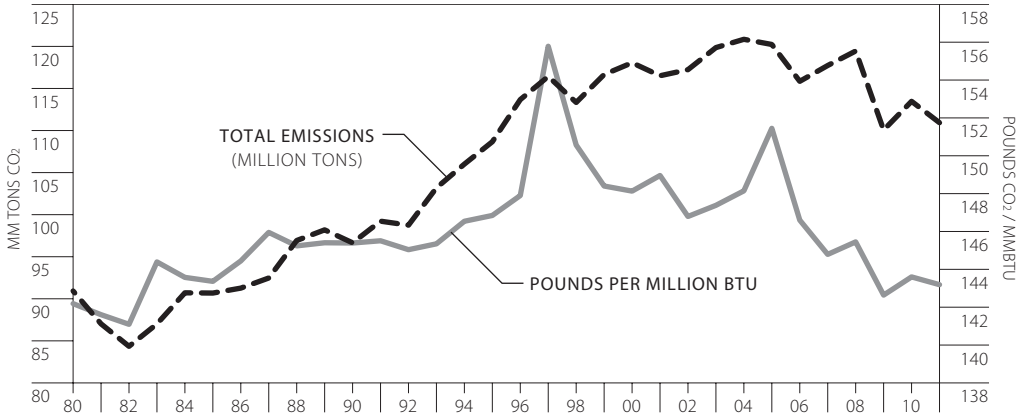
The codes, developed and enforced by the Wisconsin Department of Safety and Professional Services or local code officials, establish minimum energy standards for new construction, major renovation and existing rental units.

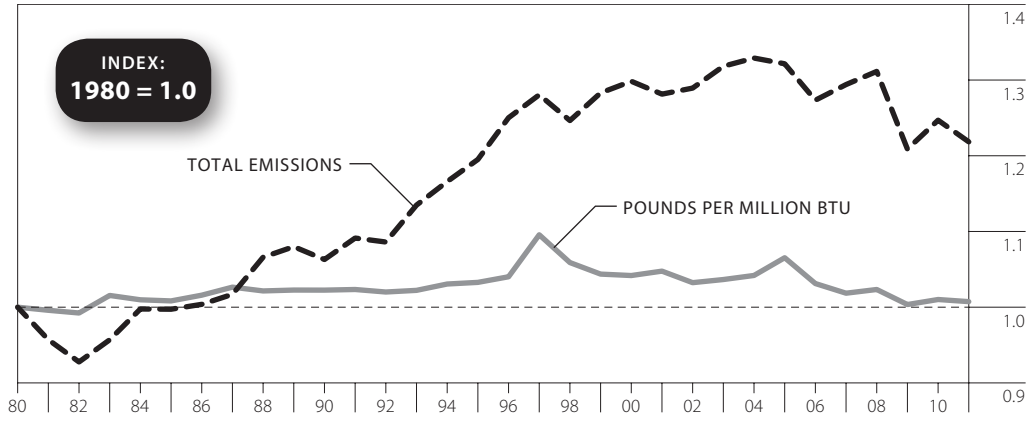
# Wisconsin Carbon Dioxide Emissions from Energy Use

**$CO_2$ EMISSIONS 1.9%**

Wisconsin's $CO_2$ emissions from energy (pounds per MMBtu) decreased 1.9 percent in 2011. Since 1990, total $CO_2$ emissions, in millions of tons, have increased 14.8 percent, but 2011 levels reflect a decrease of 7.8 percent from 2010.

**1980-2011** MILLIONS OF TONS AND POUNDS PER MILLION BTU[a]




| Year | Tons $CO_2$ (Millions) | Pounds $CO_2$ Per MMBtu |
|---|---|---|
| 1980 | 90.9 | 142.2 |
| 1985 | 90.7 | 143.4 |
| 1990 | 96.7 | 145.4 |
| 1995 | 108.7 | 146.8 |
| 2000 | 118.1 | 148.1 |
| 2005 | 120.2 | 151.5 |
| 2006 | 115.8 | 146.6 |
| 2007 | 117.7 | 144.8 |
| 2008 | 119.5 | 145.5 |
| 2009 | 110.1 | 142.7 |
| 2010 | 113.5 | 143.6 |
| **2011[p]** | **110.9** | **143.2** |

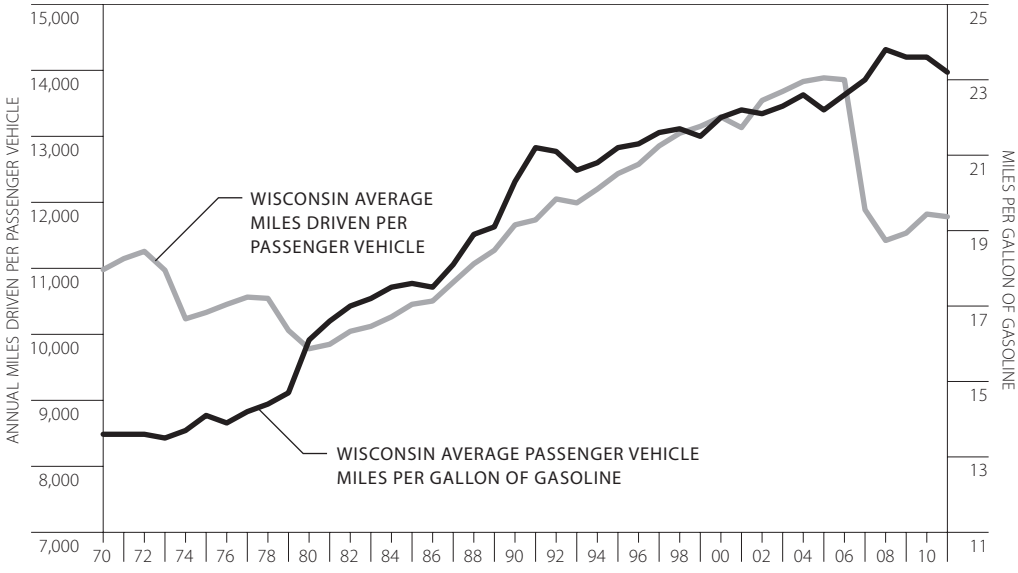
**a** Does not include electric imports.

**p** Preliminary estimates.

**Source:** Compiled from tables in this book for fuel use, and U.S. EPA emission factors.

# Average Miles Driven Per Vehicle and Average Miles Per Gallon of Gasoline, Wisconsin and United States

**1970-2011**




| Year | Average Annual Miles Per Passenger Vehicle[a,b] | | Average Passenger Vehicle Miles Per Gallon of Gasoline[a,b] | |
|---|---|---|---|---|
| | Wisconsin | U.S. | Wisconsin | U.S. |
| 1970 | 10,980 | 9,892 | 13.6 | 13.5 |
| 1975 | 10,332 | 9,309 | 14.1 | 14.0 |
| 1980 | 9,782 | 8,813 | 16.1 | 16.0 |
| 1985 | 10,455 | 9,419 | 17.6 | 17.5 |
| 1990 | 11,659 | 10,504 | 20.3 | 20.2 |
| 1995 | 12,435 | 11,203 | 21.2 | 21.1 |
| 2000 | 13,293 | 11,976 | 22.0 | 21.9 |
| 2005 | 13,886 | 12,510 | 22.2 | 22.1 |
| 2006 | 13,858 | 12,485 | 22.6 | 22.5 |
| 2007r | 11,888 | 10,710 | 23.0 | 22.9 |
| 2008r | 11,422 | 10,290 | 23.8 | 23.7 |
| 2009r | 11,534 | 10,391 | 23.6 | 23.5 |
| 2010r | 11,822 | 10,650 | 23.6 | 23.5 |
| **2011p** | **11,782** | **10,614** | **23.2** | **23.1** |

**a** Wisconsin and U.S. figures come from different sources and may not be directly comparable.

**b** Light duty vehicles with a short wheel base are passenger vehicles including passenger cars, light trucks, vans and sport utility vehicles, all with a wheel base of less than 122 inches.

**p** Preliminary estimates.

**r** Revised.

**Source:** Wisconsin Department of Transportation, Division of Planning and Budget, Bureau of Policy Planning and Analysis, personal communication (1993); U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, table 1.8 [DOE/EIA-0035 (2013/03)] (March 2013) http://www.eia.gov/totalenergy/data/monthly.

**AVERAGE NUMBER OF MILES DRIVEN ANNUALLY 0.3%**

The average number of miles driven annually per vehicle in Wisconsin decreased 0.3 percent in 2011. It is 20.5 percent higher than in 1980 and 11.0 percent higher than the U.S. average.

Fuel efficiency has been relatively stagnant since 1991 because of the increasing number of less fuel efficient large cars sold each year. Wisconsin cars were 70.6 percent more fuel efficient in 2011 than in 1970.

Data have been modified beginning in 2007 to include additional types of vehicles because of increased use of larger vehicles by residential households.